REMARKS

The present Amendment and request for reconsideration is filed in response to the Office Action mailed December 15, 2004. Claims 1-23 remain pending in the application. Claim 24-27 have been withdrawn. Claim 28 has been added with this Amendment and is pending.

We appreciate the Examiner's statement in that communication that the rejections of record have been withdrawn. We thank the Examiner for her reconsideration.

Although we believe that the Claims as previously amended are allowable, we have amended the language of Claim 1 slightly to clarify the distinction between the prior art cited in the Examiner's Office Action and the Applicant's invention. We have also added a new claim, Claim 28, clearly supported in the Applicant's Specification [e.g. Figure 3, and original Specification, p. 14, line 10] which further differentiates the Applicant's invention from the prior art cited in the Examiner's Office Action.

Response to § 102(b) Rejections

In the Office Action, Claims 1-23 were rejected under 35 U.S.C. § 102(b) as being anticipated by Hallman et al. (US 3,637,377 – hereafter referred to as "Hallman") and Franer et al. (US 3,859,094 – hereafter referred to as "Franer").

Applicant respectfully traverses the rejections.

The Examiner is correct in noting that the patterning method disclosed by Hallman, and the Thermofax transfer process disclosed by Franer, have similarities to the invention disclosed by the Applicant. Indeed, we acknowledge that Claim 1, as amended in our April 29th communication, can be interpreted to read on figures 9-13 of Hallman if some details of the Hallman specification are ignored. However, the current Amendment clarifies the distinct elements of the Applicant's invention, and removes any remaining ambiguity. This should place the Claims as currently amended in a condition for immediate allowance.

As amended in a communication on April 29, 2004 and further in this communication, Claim 1 now states:

"Claim 1: A process for patterning a substrate comprising the steps of:
coating a carrier with a photosensitive material,
exposing the photosensitive material to a pattern of radiation, and
physically transferring the exposed material to the substrate."

Claim 2 adds to this the step of:
"..developing the exposed photosensitive material after the material has been transferred to the substrate."

Hallman

The Examiner specifically refers to the Abstract and col. 2, lines 50-70 of Hallman in her § 102(b) rejection. We respectfully observe that this cited material does not in fact disclose the Applicant's claimed invention.

In the citation, Hallman discloses a process of patterning using a "substrate or support member 12" [col. 2, line 52], which supports an "electromagnetic-radiation-sensitive element" [col. 2 line 50]. This "element" comprises two layers, a "silicon or metallic layer 14" [col. 2, lines 53] and an "overlayer 16 of inorganic material" [col. 2, line 54].

If the "substrate or support member 12" is to be interpreted as corresponding to the "substrate" of Applicant's Claim 1, then Hallman clearly does not anticipate Applicant's invention. The attachment of this "element" to the "support member" to be patterned clearly occurs ***before*** exposure occurs. It is the initial starting point [Fig. 1] of the process, and exposure occurs ***after*** attachment to the substrate [e.g. Hallman Figs. 2, 9]. The process described in the cited portion of Hallman therefore begins with the "element" already physically attached, perhaps physically transferred, but more likely coated through any one of a number of standard coating processes [col.4, lines 32].

Physical transfer ***after*** exposure, as described in Claim 1 of the Applicant's invention, is therefore not described by the portions of Hallman cited by the Examiner.

Likewise, the subsequent development of a layer after it has been transferred, as stated in Claim 2 of the Applicant's invention, is not described by the portions of Hallman cited by the Examiner, since the exposure (but not development) occurs ***prior*** to attachment to the substrate in the Applicant's invention, not after.

We have noted the contents of the Specification of Hallman with some interest, however, and understand that the Applicant's Claims might be interpreted as reading on some of the other material of the Specification of Hallman not specifically cited by the Examiner. Although this would require that certain details of Hallman must be ignored, we present this interpretation to clarify the unique properties of the Applicant's invention.

In Hallman, Fig. 9, an "electromagnetic radiation sensitive element 10" [col. 6, line 19] comprises an "overlayer 16 and a metallic layer 14" [col. 6, line 43] on the "substrate or support member 12" [col. 2, line 52]. By some means, which can include coating [col. 4, line 6] the element 10 is formed on the substrate 12. Hallman Fig. 1 and Fig. 9 can therefore be interpreted to disclose the resulting product of

coating a substrate or support member with a radiation sensitive element.

After this, Hallman Fig. 9 discloses the exposure to "incident electromagnetic actinic radiation" [col. 6, lines 21-22] which causes "interaction ...to consume in depth all of the metallic layer at discrete portions" [col. 6, lines 42-44], creating the structure shown in Hallman Fig. 10. Since the radiation in Hallman Fig. 9 contains regions of exposure and other regions which are not exposed, Hallman Fig. 9 therefore arguably discloses a subsequent step of:

exposing the radiation sensitive element to a pattern of radiation.

Finally, in Hallman Figs. 11 and 12, "an appropriate flat member 36 made of any convenient material" is brought "in contact with the outer surface of the overlayer 16," [col. 6, lines 52-54] and the materials are chosen such that the "element" bonds more to the member 36 rather than to the substrate 12, such that they "easily separate" [Hallman col. 6, lines 64]. This creates the resulting "article A of FIG. 12 consisting of the member 36 provided with a silicon or metallic pattern formed by the remaining portions 42 of the metallic layer 14, the remaining portions 40 of the overlayer 16 being disposed between such silicon or metallic portions 42 and the member 36" [col. 6, lines 71-75].

Hallman Figs. 11 and 12 can therefore arguably be interpreted as disclosing a subsequent step of

physically transferring the exposed element to the member.

If one interprets Hallman's "substrate 12 " as Applicant's "carrier," Hallman's "radiation sensitive element 10" as Applicant's "photosensitive material" and Hallman's "member 36" as our "substrate," these three steps are very similar to the steps in Applicant's Claim 1.

The Applicant's invention, however, is distinct both in intent and embodiment.

The goal of the Applicant's invention is the patterning of integrated structures, and particularly microscopic structures of integrated circuits (ICs) and other microdevices [original Specification, p. 3, line 19; p. 14, line 13]. The final "substrate" in Applicant's invention is therefore the ***target*** of subsequent processing and contains the "layer 220 of a material ***to be patterned***" [e.g. original Specification, p. 9, line 21; emphasis added].

This contrasts with the above interpretation of Hallman, in which the transfer occurs to the "member 36," which is clearly ***not*** the target of subsequent patterning. Instead, the "member 36" is merely a support structure, with the specification that it be "flat" and "made of any convenient material" [col. 6, line 52]. Hallman has in mind "commercially available pressure adhesive tape" as "a convenient material for the member 36" [col. 6, line 68-70]. This is very different from a silicon wafer as used in IC manufacturing, or any of the substrates considered by the Applicant.

The subsequent steps disclosed in Hallman [Figs. 13-22] describe additional embodiments of Hallman's invention, in which subsequent exposures and physical transfers occur. Again, some similarity might be drawn, since Applicant's invention also comprises steps of exposure and physical transfer.

However, here as well, the destination of the transfer is only a "substrate 46" [col. 7, line 22-23], which "may be of any convenient material, such as a metallic foil, a plastic sheet, a paper board or the like" [col. 7, lines 26-27]. Again, this is very different from a silicon wafer as used in IC processing or any of the other substrates considered by the Applicant.

We do appreciate, however, the similarity at first glance of these physical transfer processes and the Applicant's invention. We have therefore amended Claim 1, to make clear that the Applicant's objective is the patterning of the substrate to which the exposed material is transferred. We have also added Claim 28, which explicitly describes a subsequent processing step for the substrate. Nowhere in Hallman is the subsequent processing of the transfer destinations "member 36" or "substrate 46" described.

With these amendments, Claims 1, 2, and 28 are clearly in a condition for allowance over Hallman. Since the all of the other pending claims are dependent on Claim 1 or claim 2, and Claims 1 and 2 are not anticipated by Hallman, all the subsequent dependent claims are not anticipated by Hallman as well, and are also in a condition for allowance.

To clarify the unique aspects of the Applicant's invention, we also note that the details of Hallman's "radiation sensitive element" are very different from those used in the embodiments of the Applicant's invention. In particular, Applicant discloses using photoresist [Applicant's Claim 6] which forms a latent image [original Specification p. 12, line 20]. The photoresist with the latent image is physically transferred, and then developed after transfer to the substrate is complete [Applicant's Claim 2].

We should note that a typical photoresist is an organic polymer. It is not metallic, typically contains no or very little metal, and comprises long chains of carbon atoms. Exposure causes scission or crosslinking in the polymer chains, changing the molecular weight, but creating physically apparent structures from this latent image requires development. The "element 10" of Hallman comprises a "metallic layer 14" [A list or suitable metals is found in col. 2, lines 58-64] and an "overlayer 16" of an "inorganic material" [a long list of reactive inorganic materials are found in col. 3, lines 18-75]. The layer and overlayer spontaneously react upon photoexposure, and photoexposure alone causes the "interaction ...to consume in depth all of the metallic layer at discrete portions" [col. 6, lines 42-44]. No subsequent development is required.

The transfer of organic polymers [Applicant's Claim 5] or photoresists [Applicant's Claim 6] comprising latent images that require development is therefore clearly not disclosed, anticipated or even suggested by Hallman.

Therefore, beyond the general statement of allowability above, the additional dependent Claims for Applicant's invention, and particularly Claims 5 and 6, when structured in independent form, would certainly be in a condition for allowance in any case.

Franer

The Examiner specifically refers to col. 1, lines 25-70 of Franer in her §102(b) rejection. We respectfully observe that the cited material in particular, and Franer in general do not in fact disclose the Applicant's claimed invention.

Franer discloses a "sheet material 10" [col. 2, line 47] comprising a "thin, flexible backing 12" [col. 2, line 48], a "heat-fusible layer 16" [col. 2, line 56], and a heat sensitive "imageable layer 14" [col. 2, line 58]. These materials are clearly intended for use with infrared (IR) exposure, such as in a Thermofax machine [col. 4, line 14]. The IR sensitivity of these various layers is therefore very important to the functioning of Franer's invention, and qualifies his descriptions throughout [e.g. col. 2, lines 48, 51, 61, etc.].

Although Franer does not explicitly disclose it, coating would be a common means for creating a backing with such attached layers, and Franer therefore could be considered to disclose:

> coating a backing with an infrared sensitive heat-fusible layer.

Franer does disclose exposing the "sheet material 10" while in close proximity to a "receptor 30," which is preferably a "thin flexible film or sheet (e.g. paper, plastic, metal"[col. 4, lines 40-44], and discloses physically transferring some "portions 22b" of the heat-fusible layer to the "receptor 30" [col. 4, line 32-33, and Fig. 4]. Therefore Franer does disclose:

> exposing the heat-fusible layer to a pattern of infrared radiation.

and

> physically transferring portions of the exposed heat-fusible layer to the receptor.

If one interprets Franer's "backing" as Applicant's "carrier," Franer's "heat-fusible layer" as Applicant's "photosensitive material" and Franer's "receptor" as our "substrate," these three steps are very similar to the steps in Applicant's Claim 1.

However, as with Hallman, the Applicant's invention is distinct both in intent and embodiment.

Nowhere in Franer is an entire photosensitive layer, undeveloped, physically transferred from a carrier to a substrate ***prior*** to development. Instead, the entire sheet material is placed in contact with the receptor, and portions of the layer in contact with the receptor "fuse and becomes tacky" [col. 4, lines 28-29] upon direct exposure to infrared light. The sheet is then pealed off the receptor, and only some portions stick to the receptor.

The final result of Franer is the receptor 30 with portions 22b of material tacked to it [Fig. 4]. Subsequent processing of the receptor 30 does not occur, although additional layers of different materials can be added to make more complex patterns on the receptor [col. 4, lines 54-68 and col. 5, lines 1-10]. The Applicant's Claims as amended with this communication, in which the target of patterning is clarified to be the substrate itself, and particularly Claim 28, in which the substrate is etched, are clearly not disclosed or suggested in Franer.

Therefore, as amended, Claims 1, 2, and 28 are clearly in a condition for allowance over Franer. Since the all of the other pending claims are dependent on Claim 1 or claim 2, and Claims 1 and 2 are not anticipated by Franer, all the subsequent dependent claims are not anticipated by Franer as well, and are also in a condition for allowance.

Furthermore, we note that Franer's materials are chosen with specific regard to their IR properties. Photoresist [Applicant's Claim 6] and exposure to either UV photons [Applicant's Claim 7] or electron beams [Applicant's Claim 8] are clearly not disclosed or suggested by Franer.

Therefore, beyond the general statement of allowability above, the additional dependent Claims for Applicant's invention, and particularly Claims 6 – 8 when structured in independent form, would certainly be in a condition for allowance in any case.

Summary

Therefore, as amended on April 29, 2004 and further amended with this communication, Claims 1, 2 and 28 are clearly not anticipated or suggested by either Hallman or Franer.

As Claims 3-23 are all dependent on Claims 1 and/or 2, they therefore also cannot be anticipated or suggested by either Hallman or Franer.

We should also note that the Applicant's claimed invention is not suggested by any combination of Hallman and Franer, as Hallman teaches the spontaneous reaction of a

metal and inorganic layer with exposure to intense white light, while Franer's material fuses under infrared exposure in a Thermofax machine. There is no suggestion whatsoever to combine the inventions from these two disparate domains into a single invention, and in no circumstances do they suggest their application to creating latent images in polymers or photoresists with subsequent ultraviolet or electron beam exposure, as presented in Claims 5 – 8.

We therefore respectfully request that the Examiner withdraw all rejections based on Hallman and Franer and pass the case to issue at the earliest possible date.

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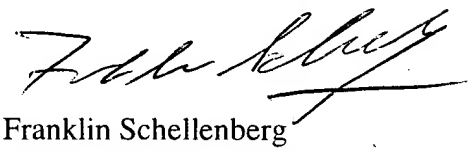
Respectfully submitted,



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